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THE CHANGING STATE OF MARKET RESEARCH METHODOLOGIES: AN OVERVIEW

by

Stephen L. Phakisi

A project submitted to the Department of Rural Economy in partial fulfillment of the requirements for the degree of Master of Agriculture in Agricultural Economics.

Department of Rural Economy

Edmonton, Alberta

Fall 1996

University of Alberta

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The undersigned certify that they have read, and recommend for acceptance, a project entitled The Changing State of Market Research Methodologies: An Overview submitted by Stephen L. Phakisi in partial fulfillment of the requirements for the degree of Masters of Agriculture in Agricultural Economics.

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ABSTRACT

As a complement to traditional macro-oriented demand analysis, increasing attention is being placed on more micro-oriented methodologies as marketing researchers seek to understand the market changes. Salient changes in consumers' lifestyles and the way consumers perceive quality in products and services influence the way marketing and economic research is conducted today. Also, agri-food industries, especially beef industries, may be focusing more on marketing products rather than the traditional commodity-oriented approach in the sale of agricultural commodities. Suppliers of products and services appear to be putting more emphasis on consumers' perceptions as the basis for designing products and services. This shift in emphasis has implications with respect to methods of conducting research and, the design and implementation of marketing strategies. As a result, researchers seem to be moving away from developing simple and accurate tools toward models which are rich in psychological detail. This paper focuses on selected research methods used in marketing and compares how these methods perform in answering a variety of questions in marketing. A general conclusion from this overview is that qualitative research is best suited to answering questions such as 'what', 'why', and 'how' but not 'how many?'. Quantitative research on the other hand, is concerned with statistical and numerical measurements. The use of many quantitative research approaches have proved inadequate in marketing management, especially where individual consumer's behavior is involved.

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Chapter 1

INTRODUCTION

i. Background

Changes in consumers lifestyles and impacts of this on consumption patterns have affected food markets. Product development encompasses product attributes such as ready to cook, microweavable, low fat, and low cholesterol as prominent features of product labels. Individual consumer's perceptions of these and other attributes affect their purchases. Researchers need to ascertain consumer attitudes in order to determine the direction food industries should take in new product development and merchandising techniques. For example, questions have arisen regarding how buyers evaluate attributes of food products. What can producers and packers or processors do to improve the relative position of their food products? How do different market segments differ in their buying behaviors and preferences? How would new potential products be initially received in the market? In the light of the growing competition in food products markets and interdependent product and promotion strategies, knowledge of consumers' preferences is necessary for effective marketing strategies.

Beef is one specific example. Like many other food products, changes in consumption patterns for beef have been the source of concern to many in the beef industry. As a result, several studies have been directed toward identifying the sources of changes in beef consumption and other foods. Some studies have been directed toward relating meat consumption to demographic factors such as family size, household income, and family consumption (Chavas,1983

and 1989; Capps et al., 1988; Eales and Unnvehr, 1988; Cox et al., 1989; and Lee, 1989). Many of these studies have employed secondary annual aggregate time-series in addressing some of the questions suggested in this paper. Due to increasing differentiation and heterogeneity of products, those traditional analytical methods are becoming inadequate in addressing a wide range of marketing research problems involving buyers' behavior (Anderson and Bettencourt, 1993).

In order to surmount these problems and to address some of these questions already raised, this paper examines a selected group of marketing research approaches using primary data that can be applied to a broad range of food product markets. This review also compares the suggested research approaches in relation to their applicability in marketing management. Questions of interest relating to consumer perceptions and product development are also raised. Several economics and marketing techniques suited for answering these questions are discussed.

ii. Problem Statement

The use of traditional economic research approaches in marketing management is not always adequate where interest is on individual buyer's behavior. Most of these research techniques require a specific number of assumptions to be satisfied in order to obtain a reasonable set of estimates (Anderson and Bettencourt, 1993). Developing a set of reasonable estimates using traditional demand models require: the products or subjects of investigations to be homogeneous; prices and quantities demanded must be known with certainty; and consumers must have full information about the market. Anderson and

Bettencourt found none of these assumptions valid when studying product preferences in the fresh and frozen seafood markets.

Traditional demand analysis is often based on secondary aggregated market data, which may not capture the heterogeneity that exists between individual respondents.

Specific to beef, many studies of meat demands have employed annual time series data on aggregate per capita consumption to identify the sources of changes in beef consumption (Braschler, 1983; Chavas, 1983; Wohlgenant, 1985; and Eales and Unnevehr, 1988). Chavas (1989) concludes that changes in consumption patterns away from beef to poultry can be attributed to changing relative prices, but that changing life style and concern about health-related issues have likely influenced beef-purchasing behavior. However, changes in lifestyles and health-related factors are difficult to measure using traditional demand analysis approaches.

Changes in consumer lifestyles and their impacts on product selection are well recognized by processors and marketing management in the food industries. Many researchers are now adopting a consumer-oriented approach in order to extend traditional demand models to include consumers' perception of quality based on product attributes. This approach requires that researchers have insights into the way consumers evaluate alternative offerings of products and services. These insights into consumers' perceptual protocols are especially useful in product development, market segmentation and marketing communication. These changes in the way researchers conduct demand analysis suggests that the agricultural and food industry may be focusing more on marketing rather than the traditional commodity-oriented approach.

Manufacturers and marketers are now placing more emphasis on consumers' perceptions of quality in designing products and services. Specific product attributes appropriate to particular market segments are now emphasized in both product development and the marketing function. This shift of emphasis has implications regarding which research methods are more appropriate for various types of information required in decision making. It is this consumer-oriented approach to the development and marketing of products and services that inspires the overall purpose of this review.

iii. Objectives

The overall objective in this study is to review marketing research as it applies to the agri-food industry. A review of selected research methods used in marketing and a comparison of how these methods perform in answering a variety of questions in marketing is conducted. The review will provide a framework for undertaking some of the tasks facing marketing management. It will emphasize selected research techniques that are applicable to the food industry. Included in the descriptions of these techniques will be their strengths, weaknesses and selected results from previous studies. Some other questions of interest will also be discussed. For instance, researchers are interested in measuring various aspects of the marketing system such as demographic characteristics that will provide a basis for dividing or segmenting the total markets for a product.

Just as there are many questions to be answered in marketing management, so there are many research techniques available in the marketing field. These techniques are either qualitative or quantitative in nature. The two widely employed qualitative techniques that are of interest in this research, are the

focus group and the depth interview techniques. This review will also cover quantitative techniques such as survey research, experimental research, and a selected number of multivariate techniques, especially conjoint methods.

iv. Outline

The research techniques and their applications are discussed in Chapter Two. Researchers use these techniques to learn and understand consumers' behavior. All research approaches can be classified as either exploratory, descriptive, or causal; they can also be classified as either quantitative (i.e. survey research, and experimental research) or qualitative (i.e. focus groups and depth interviews). Quantitative is defined in the sense that the approach provides information from which numbers can be analyzed while qualitative approaches are concerned with finding out what people think or feel (perceptions). The discussion includes descriptions and applications for each of the approaches. These research approaches are also compared and contrasted to each other .

It is in Chapter Three that the discussion turns to modeling and analytical approaches. After having collected and prepared data for analysis, researchers have to select an appropriate statistical technique for analysis. These techniques can be broadly classified as either univariate or multivariate based on the nature of the problem. This chapter provides an overview of a selected multivariate techniques including discriminant analysis, conjoint analysis, factor analysis, cluster analysis and multidimensional scaling. Special emphasis is put on conjoint measurement techniques and their application in marketing management.

In Chapter Four a conceptual framework for the discussion on marketing research is developed. The focus of the discussion shifts toward various applications of marketing research techniques of interest in this study. The general purpose of this chapter is to demonstrate how research practitioners have used research tools in marketing in an attempt to address several issues that arise in marketing management. The marketing management phenomena is a basic aspect of marketing research. Researchers are interested in measuring various aspects of the marketing system such as demographic characteristics that will provide a basis for dividing or segmenting the total market for a product. Defining the marketing problem including the object and characteristics relevant to the problem also requires an explicit description of appropriate measurement. Since the type of both problem and measurement also dictates the type of modeling and analytical tools, an attempt is made to review research work that would reflect how measurement scales influence the choice of modeling and analytical approach.

In the last chapter both the type of problems and issues raised earlier in this study and the appropriate research methods in each case are summarized. A general conclusion on the various uses of qualitative and quantitative research is given based on the preceding discussion. This includes the strengths and weaknesses of these research approaches. The concluding summary also looks at the overall limitations of marketing research and how some of these limitations can be alleviated through some new developments in the field.

Chapter 2

RESEARCH METHODOLOGY

i. Introduction

Market research is best described as a process whereby managers attempt to collect information about the behavior and/or attitudes of consumers or end users of a product or service for use in strategic marketing management. Birn, et al. (1990) sees market research as not only a means of providing management with market and marketing information, but also as a means to reduce uncertainty when planning marketing strategy and to monitor performance after the strategy has been implemented. Its success in aiding decision-making is, however, dependent on the successful definition of the problem. Any approach to designing market projects must therefore start with a clear and concise problem definition.

Management needs to ask questions such as what information is necessary to solve a marketing problem, and how should this information be obtained and used. The method of collecting this information will also imply the type of measurement and analytical techniques to use in obtaining the results. How much budget should be allocated to a particular project?. Providing answers to such questions translates into a research plan that will guide the research process.

Having justified the need for a research study, management has to choose whether the study should be based on either qualitative or quantitative methodologies. This type of decision is usually straightforward because the

project objectives often imply the most suitable approach. For instance, a qualitative study may be required to explore the possibility of successful positioning strategies for an existing product in a new market. The review in this chapter includes both qualitative and quantitative research methods. A number of selected methodologies for data collection are discussed for each of these classes. Included in the discussion is a comparison of the selected methods and an indication of problems for which each is best suited.

As noted by Gordon and Langmaid (1988), qualitative research answers questions such as 'What', 'How' or 'Why'. It cannot answer the question 'How many'?. Even though several qualitative methods are used in marketing research, they all share some features:

- they involve samples that are not necessarily representative of the populations they are drawn from;
- unlike in quantitative studies, qualitative approaches employ a wide variety of data collection techniques and they are usually dynamic due to their unstructured nature; and
- because qualitative studies are generally not at aggregated level (as they often are in quantitative studies), they allow researchers to ascertain information on individual consumer's perceptions, values and beliefs (Gordon and Langmaid, 1988).

It can be deduced from these features that qualitative research tends to be exploratory, evaluative or creative in nature. Because they are open-ended and flexible in nature, qualitative methodologies may give some depth of understanding if they penetrate through superficial responses for more precise responses. If this is the case, they tend to provide a broader and deeper database for marketing ideas. On the other hand, quantitative research involves

statistical examinations using numerical measurements to predict or describe the strength of relationships. Unlike qualitative research which provides subjective assessments, quantitative research is designed to generate concrete information about the characteristics and behavior of the population. These research methodologies are discussed below.

ii. Qualitative Research

As already mentioned, qualitative research involves finding out what people think and feel. This type of information is subjective since it involves stated perceptions rather than numbers or values relating to observed behavior. Since virtually all qualitative marketing research is directed at subjective aspects of consumer behavior, qualitative methods use primary data to understand more about things that can not be directly observed or measured. Even though a wide variety of primary data collection methods are available to marketing researchers, only focus group and depth interview methods will be discussed in this chapter.

a. Focus Group

The focus group or group interview approach is a technique that grew out of group therapy methods in psychology. It involves a group of participants that have some common characteristics that relate to the topic discussed in the group (Blanken and Breen, 1993). A focus group interview is a group discussion that is focused on a series of topics introduced by a discussion leader. The discussion leader (moderator) encourages group members to express their own opinions on each topic and to react to the views of others. This concept is based on the idea that individuals who share the common problem will be more willing to talk about it among themselves. It is a means of gaining insights into behavior and perceptual information on a specific topic

through a group discussion. Rather than using the usual approach of a questionnaire, this approach encourages participants to discuss attitudes and perceptions about the topic of discussion under the guidance of a moderator. Even though the moderator is there to establish the rapport during the discussions, this is more of a passive role. The moderator uses an outline or guide that has been prepared ahead of time to probe and guide the participants through a discussion based on research objectives. The number of sessions for such a process depend on the complexity of the topic, time and expense considerations. Having a number of study groups is necessary to provide replications of focus group interviews. For instance, if two groups of individuals with similar characteristics give different directions, further sessions should be conducted.

Greenbaum (1993) identifies nine different uses of focus group techniques, namely new product prototype testing, positioning studies, habits and usage studies, advertising/ copy evaluations, promotion evaluations, idea generation, and employee attitudes and motivation studies. In each of these categories, the use of focus groups is aimed at generating meaningful information about consumers' attitudes towards a variety of different topics.

Having presented a selected number of situations where focus groups may be used, it is important to point out that focus groups cannot be expected to provide all answers. These are only one of a number of methods to be employed in problem solving. However, when used properly, the focus group technique offers a number of advantages over other techniques (Bellenger and Greenberg, 1978). This technique provides a combined group effort which may produce a wide range of information and ideas, especially where sufficient replication indicate that numbers of focus groups complement each others' findings. Unlike individual interviews, this technique may offer participants

more stimulation and opportunity for meaningful comments to arise. Also, because of the unstructured nature of the focus group technique, discussions may often provoke more spontaneity that can be expected from normal interviews. Researchers have suggested that individuals may find comfort in the group and are more ready to speak out. In focus groups, the use of group sessions speed up the interview process and data collection. Data from this approach can be analyzed in detail after every interview session. This may give the researcher an opportunity to learn directly from consumers, in their own terms, without anybody having to categorize or interpret customer reactions on their behalf (Greenbaum, 1993).

This research technique is not without disadvantages and misuses. For example, focus groups are often used in place of quantitative studies largely because they are cheaper and easier to conduct than quantitative studies that use surveys and involve experimental designs. Even though focus groups are easy to set up, they are usually difficult to moderate and interpret. Thus, among other factors, the success of this technique is largely dependent on the moderator's ability to conduct the session. Failure of moderators to encourage participants to share their feelings, anxieties, and frustrations without being biased affects the success of the group sessions. Even when moderating is effective, the collected data is rarely projectable due to selection practices. That is, samples are seldom random due to the way in which individuals are selected. Also, the group processes may not be comprehensive in reflecting the major users of a product. Another disadvantage is that it is difficult to elicit precise responses to relative issues, such as for prices, from this approach. It also may be difficult to recruit people depending on the number of focus groups conducted.

In summary, qualitative research encompasses several different techniques, and focus groups are one important technique among them. Focus groups can

either be conducted by a 'full group' (eight to ten persons), 'mini-group' (four to six persons) or as a conference call, based on the research objectives and the allocated funds. When effectively conducted, focus groups are quickly and relatively easily conducted and the resulting data are usually useful to researchers and marketing managers. The inherent attractiveness of this method can also be attributed to its lack of structure. As demonstrated earlier, this makes the approach adaptable to many different kinds of research questions. The failure of this method often occurs when the topic of discussion is not conducive to group discussion (i.e. financial status or standard of living) or where participants are competitors (i.e. small number of firms that compete in the same industry). In-depth interviews may be more successful in seeking information that respondents may otherwise be reluctant to share under group discussions.

b. Depth Interviews

Depth interviews are one-to-one interviews in which the subject matter is explored in detail. Due to its unstructured nature, depth interviews encourage respondents to talk freely and share their ideas about the subject matter. However, the success of this technique is highly dependent on the ability of the interviewer to establish a rapport and credibility at the opening of the interview and to maintain this atmosphere to the end. It is his/her duty to create an environment that allows respondents to freely express their thoughts and feelings even if they do not favor the subject of interest. The interviewer needs to get below the respondent's surface reasoning to find the underlying customer habits and preferences. Interview success depends on the ability to establish a sympathetic and relaxed atmosphere; the ability to probe the discussion, elaboration and clarification of interesting responses without biasing the context; and the ability to guide the discussion back to the topic outline when digressions are unfruitful (Aaker, Kumar and Day, 1995). As with other

qualitative methods, this method is often used to ascertain information on customers' attitudes and behavior and to measure their relative importance for the subject of investigation.

Unlike a focus group, a depth interview lacks group interaction, making the interviewer solely responsible for stimulating new ideas from respondents. This approach lacks the dynamics of the discussion that occurs among participants of a focus group. However, depth interviews may provide more in-depth information than is possible with other forms of qualitative research. This is more likely where the topic of discussion is not conducive to discussion in a group environment (such as with markets with small number of buyers). Besides, an individual may be inhibited from talking in a group due to a competitive situation.

Even though there are many disadvantages of using depth interviews, individual interviews are easier to schedule than having to assemble a number of respondents as required under a focus group technique. Dealing with one individual at a time allows one to focus on particular features of information from a particular respondent which may be difficult to do when dealing with a group. As mentioned, it is conceivable that respondents are more likely to reveal their motives and attitudes in a one-to-one interview than in a group session. The problems associated with the implementation of depth interview are great. First, one needs highly trained and experienced interviewers because the reliability of the analysis depends on the interviewer's evaluations and interpretations. Besides, the analysis and interpretations are highly subjective, which makes it difficult to successfully compare the results across interviewers. As a result, depth interviewing is seldom used except in industrial marketing where the number of potential respondents is often small. In other places where this approach is used, interviewers are often provided with structured

questionnaires which provide greater structure to the interview itself. However, this may limit the ability to follow-up on open-ended questions. The length of time required to conduct interviews coupled with the associated costs may limit the number of interviews leading to invalid results due to small sample sizes.

In spite of the usefulness of the qualitative techniques discussed in this chapter, most of their limitations and criticisms stem from the very nature of this research approach. The fact that it is often described as non-quantitative, nonobjective and judgmental indicate where its limitations lie (Bellenger et al., 1978). Qualitative research is aimed at measuring subjective opinions and attitudes, and to do so, the method involved is also subjective.

This presence of subjectivity causes the reliability of the methodology to be in question. For instance, would the same results be observed if the research were repeated? The interviewer /moderator role also creates a problem because he/she is responsible for gathering and analyzing relevant data, and for interpreting the results. Therefore a trained interview/ moderator is required. Even where one is available, the interpretation may be subject to personal bias due to the great latitude provided to the role of interviewer /moderator in qualitative research. Quantitative techniques should be used in marketing research where concrete information about population characteristics and behaviors is required.

iii. Quantitative Research

Quantitative research in marketing is designed to provide objective measurements or information about population characteristics. It differs from qualitative research in that qualitative techniques use primary data to provide subjective assessments relating to consumer behavior. The measurement and analysis in qualitative research is subject to the researcher's insights and

impressions. Measurements and analysis are more detached from the researcher's judgments when quantitative techniques are used. Quantitative techniques are also subject to validity tests and quantitative surveys can always be repeated in the future and results compared.

Quantitative techniques use both secondary and primary data to solve various problems in market research. Secondary data refers to data collected for some purpose other than for the marketing problem at hand. Sources of such data include census and government statistics. Unlike secondary data, primary data is collected to address a specific objective. It is the collection and application of primary data that forms the focus of this section. Secondary data methods of demand analysis (such as the Almost Ideal Demand System (AIDS) and its variants) will only be briefly discussed in this study.

For instance, Chen and Veeman (1991) used secondary quarterly time-series data on Canadian per capita consumption and retail prices for beef, pork, chicken and turkey for demand analysis. They used a dynamic version of Almost Ideal Demand Analysis (AIDS) model that explicitly incorporates persistence or habit formation in determining Canadian meat consumption patterns. This is the same approach that several other researchers such as Pollak and Wales (1981), Anderson and Blundell (1982), Blanciforti (1983), Chalfant (1987), Eales and Unnevehr (1988), Fulponi (1989), Atkins (1989) took following Deaton and Muellbauer (1981). Like Stone's analysis (1954a) and the Rotterdam model (Theil, 1965; and Barten, 1966), this demand modeling approach is also based on consumer demand theory.

As will be discussed in subsequent chapters, econometric approaches that have estimated demand systems often gave results that were in violation of restrictions implied by economic theory (Deaton and Muellbauer, 1981 and;

Anderson and Bettencourt, 1991). This has inspired the use of alternative demand modeling procedures, such as economic choice theory (Anderson and Bettencourt, 1991). This modeling procedure is discussed later in this study. The basic quantitative research techniques used in marketing are surveys, experiments and simulations. Only surveys and experiments are covered in this chapter.

a. Survey Research

Survey research is the most frequently used way of collecting primary data. Other than the usual questionnaire surveys, marketing data may be collected with electronic devices and single-source surveys in marketing research. For example, large supermarkets use scanners to keep track of sales by product, price and size; this also allows the seller to note the purchasing patterns for their products. Single-source research refers to procedures that obtain information such as buying behavior, media behavior and the like from the same set of specific consumers. This type of information can be obtained either through questionnaire surveys or monitoring devices.

There are as many ways of conducting surveys as there are different methods of communication. However, only personal interviews, mail surveys and telephone interview methods are referred to in this discussion. A typical survey begins with a survey design based on the problem definition (requirements of the survey, sampling plan, and measurement device) and leads into data collection and analysis. The resulting analytical information is then translated into management reports for decision making. The typical survey research process is outlined below. It proceeds by defining research objectives. The research process proceeds to determining the sample size and the sampling technique to employ. One more decision to be made before actual data collection is whether the approach should involve a mailed or telephoned or

personal interview. Having completed the research design, the data will then be collected and analyzed using the selected analytical procedure. The analytical procedure of choice is partially determined by the type of data, developed hypotheses and measurement techniques used in data collection. Finally, the research information is translated into management information for decision making.

Survey methods are employed on sample data in order to make inferences about the population from which the data were drawn. In marketing research, surveys may be designed to capture a wide variety of information on diverse subject areas. Researchers may design surveys to capture information on consumers' awareness, knowledge, attitudes, and perceptions about specific products and product features. Also assessed could be pricing, promotion and advertising strategies, and various aspects of other marketing functions. The analysis of this information may relate to demographics, psychographics, lifestyle, consumer behavior, or many other relationships of interest.

The telephone and the mail survey methods have been dominant methods for conducting surveys. As is apparent from the name itself, the interviewer using the telephone method interviews the respondent through a telephone. Since the contact is only verbal, the environment of the interview plays a relatively minor role in data collection process. Other researchers argue that this lack of direct interaction to the interview process helps people to freely report negative events or behavior (Aaker et al., 1995). Other appealing characteristics of telephone interviews may be their high response rates and relatively lower cost compared to personal interviews. Using telephone interviews makes access to certain populations a lot easier (compared to personal interviews), and this may facilitate faster data collection. Other advantages of this approach over personal interviews include lower interviewer and management needs and a

better sampling of general populations where a random-digit-dialing (RDD) procedure is used.

Even though high response rates benefit more from telephone interviews, this may not be the case in suburban and rural areas. In fact, response rates are usually lower from telephone interviews than when personal interviews are used in suburban and rural areas (Bellenger and Greenberg, 1978). There may also be sampling limitations associated with populations that have a significant number of potential respondents omitted from the sampling process as a result of having no telephones.

Mail surveys involve the designing of a questionnaire which is administered through mail. The mail questionnaire is answered at the respondent's discretion without any pressure that the presence of an interviewer may bring. This approach is the least expensive and allows for respondent's consultation where detailed recording is required. However, there is no control over who actually completes the mailed-in survey. The involvement of an interviewer may be important where respondent designation is an issue (such as a household head or marketing manager). Another major drawback of this approach is that it places more burden on the respondent's reading and writing abilities than with interviewer procedures. It may be a problem for mail surveys to get people to return completed questionnaires.

Another problem with mail-in surveys is that, if one is going to have a self-administered questionnaire, one must also restricts oneself to close-ended questions to avoid incomplete, unclear and inconsistent responses. Otherwise, responses are not comparable across respondents. Moreover, the initial response rate is often poor for mail surveys. Some form of follow-up is often required. As one might expect, the use of mail provides access to widely

dispersed samples including those that are difficult to reach in person or telephone. Unlike in telephone interviewing, respondents may have the time to give thoughtful responses or consult other sources for quality answers. This procedure does not require as much staff and facilities as does personal interviewing. Mail surveys may also be superior where sensitive or potentially embarrassing topics, such as unusual lifestyles and finances, are concerned.

Another popular method of collecting survey data is through a personal structured interview. Even though there are several ways of conducting personal interviews, they can all be characterized by the same interviewing process. They all involve an interaction between the researcher, interviewer, interviewee, and the interview environment. Both the interviewer and interviewee provide a simultaneous stimulation to one another with the environment chosen by the researcher. The interviewer has the opportunity to gauge the interview environment and can attempt to manipulate the atmosphere to stimulate interest. It may be easier to present complex questions, perhaps with the use of aids for better understanding, and achieve more complete answers. This makes personal interviews more suitable in surveys where a large amount of information is required, including the use of visual cues such as pictures of product concept or other observation and evaluation oriented tasks. Also appealing in this approach is the interviewing flexibility that is provided to the interviewer in allowing for follow-up questions for adequate answering. However, unlike depth interviews which have a free-flowing conversational style of questioning, personal interviews ask close-ended questions and there is less latitude in follow-up questioning. Finally, where longer interviews are necessary, they are better controlled under the personal interview approach.

Personal interviews are time consuming, difficult to administer, and costly. It takes a relatively longer time to reach a widely dispersed sample with this approach. One could use more interviewers to reduce the time elapsed, however this increases the need for quality control and the relative cost per completed interview. These lessen the advantages of the personal interview approach where the geographical area of interview and sample size is large.

B. Experimental Research

The experimental research approach to marketing involves the collection and analysis of primary data under a more controlled atmosphere. Marketing researchers use this approach when they want to determine the effects of changes in one or more features of products and services. For example, a researcher who wants to determine how different attributes (features) of fresh-cut beef affect the perceptions of quality in fresh beef might decide to develop an experiment using several combinations of attributes of interest. In other words, this approach allows him /her to present respondents with a number of perceptual product ideas in a controlled setting. Recent advancements in experimentation research attempt to separate individual effects to capture relationships between factors of measurement and consumer behavior (Elrod, Louviere, and Davey, 1992; Green and Wind, 1975; Louviere, 1991 and; Louviere and Woodworth, 1983) .

Marketing experiments may be conducted in the laboratory or in the field. Laboratory experiments have been used in concept testing, taste testing, advertising, simulated test markets, and other marketing functions. The concept is to control and manipulate some objects of interest and observe the effects of these offerings on individuals' responses. These responses are

measured and their relationships analyzed using analytical techniques that support the measurement of choice.

A marketing experiment starts with the definition of the problem followed by formulation of hypotheses and identification of factors involved. For example, the problem of interest could be to determine how health consciousness affects consumers' product evaluations. The general assumption may be that incorporating a "health consciousness factor" in product labeling (such as 'no cholesterol') would increase the sale of that product. Factors of interest may include cholesterol, calories, artificial ingredients, and other attributes. The experiment is then designed to test the formulated hypotheses.

Designing an experiment is much like designing a physical product. Care has to be taken to make sure that the design actually reflects the intended product or service. The purpose of designing choice experiments is to define the combinations of all factors included in the experiment in a manner that avoids correlation between alternatives. A well designed experiment is characterized by having a sufficiently rich set of attributes, choice context and sufficient variation in the attribute levels. However, it is practical to present respondents with all possible levels of each factor (full factorial) only if there are very few factors and levels. If a full factorial design generates too many combinations, the number can be reduced by adopting a fractional factorial design implied by the Interdependence of Irrelevant Alternatives (IIA) assumption[1] (Louviere, 1991 and; Batsell and Louviere, 1991) .

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[1] This axiom makes it possible to define a simple operational individual choice model. It implies that one could predict the demand for alternatives that do not currently exist. This axiom states that for a specific individual's choice of any alternative over another, the choice probabilities of any two alternatives is unaffected by the absence or additions of any other alternatives in the choice set (Ben-Akiva, 1985; and Domencich and McFadden, 1975).

Full factorial design refers to an experimental design that takes into account all possible combinations of experimental factors, where each factor is varied in two or more ways (levels). The dimensions of the experiments are then defined by the number of factors and the number of levels.

Batsell and Louviere (1991) use the term “experimental choice analysis” to encompass all necessary steps involved in the design, implementation and analysis of data obtained from choice experiments. These steps involve the design of formal experiments that satisfy necessary and sufficient conditions for probabilistic choice model; data collection and estimation of parameters of estimates from choice experiments; specification tests; and application of estimated models of choice behavior in real markets.

The type of metric response measurements used in experimental design or any other data collection procedure will determine which estimation procedure to use. For example, the data set collected from first-preference approach relates directly to discrete individual choice responses. A large body of stated choice literature in marketing and transportation[2] has used a simple multinomial (MNL) model or some variant of this to obtain estimates of parameters. These estimated parameters are used to obtain choice probabilities for each alternative for each replication for use when predicting market share or total demand.

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[2] Refer to a special issue by Journal of Transport Economics and Policy (1988) for more on stated preference methods.

iv. Chapter Summary

The research techniques available in marketing research can be classified as either qualitative or quantitative. Qualitative research is gaining popularity in marketing as more researchers have used these research methods to generate information on which strategic marketing decisions are based. The qualitative research methods are concerned with the subjective assessments of consumer behavior and consumers' perceptions on issues. However, qualitative research does not allow the researcher to make statistical inferences or quantitative statements. Quantitative research, on the other hand, is based on concrete information that is subject to statistical testing. In fact, generated hypotheses can be tested in any planned quantitative research.

Two types of qualitative research methods were discussed in this chapter, namely focus groups and depth interviews. Focus groups are informal interview sessions where six to ten people familiar with the topic of interest are brought together with a moderator to discuss a specific marketing problem. Depth interviews are, on the other hand, detailed interviews with people relevant to the research problem.

The basic quantitative research methods outlined in this chapter are surveys and experimental research. The purpose of survey research is primarily inferential. An attempt is made to select randomly a truly representative sample of a total population and the results are used to make inferences on characteristics that exist within the total population. Unlike qualitative methods, survey research is designed to capture concrete information about consumers' awareness and perceptions on various marketing problems. Surveys can be conducted by mail, personal interview, and many other methods not discussed in this chapter. Marketing researchers make trade-offs to balance the cost

against the expected quality of information in selecting the method of collecting survey data.

Another method of generating primary data that is gaining popularity in marketing is experimental research. The experimental approach in marketing research involves data generation by manipulating factors under tightly controlled conditions to test for cause and effect.

There are several alternative methods of analyzing primary data in marketing research. The measure of response and the method of data collection used, among other factors, influence the choice of analytical approach. These analytical approaches are presented in the next chapter.

Chapter 3

ANALYTICAL AND MODELLING PROCEDURES

i. Introduction

When the required data have been collected, whether from primary or secondary sources, these data must be analyzed and transformed into information that management can use in decision-making. There are several analytical and modeling procedures available in marketing research and the choice of each is affected by the type of data, research design, and the assumptions underlying each research project. Classification of data includes nominal, ordinal, interval, and ratio scales of measurements. Different analytical techniques are more suited to each of these measurements. For example, a nominal classification involves assigning numbers to mutually exclusive objects that are either identical or different. The purpose of this is simply to distinguish objects from one another; any comparisons of these numbers are meaningless. Typical applications of this type of measurement scale in marketing may be seen in classifications of data points by sex, geographic area, or social class. The only possible arithmetic operation on this scale is a count of each category. At the other extreme is the ratio scale, a special kind of interval scale that permits comparisons of absolute magnitude. For example, this could indicate that prevailing consumption level of beef is 50 percent less now than it was years ago.

The most common technique of statistical analysis that is appropriate for nominal data is cross-tabulations to analyze the association among and between variables that are nominally scaled. Most qualitative studies in marketing

research go no further than cross-tabulation; however, sophisticated techniques that use either qualitative or quantitative approach also use cross-tabulation to explòre the data set (Aaker, Kumar and Day; 1995). In general, a basic analysis is always necessary to provide the researcher with an initial picture and insight on which aspects of the data are more useful. For instance, a researcher concerned with consumer profiles may want to tabulate intentions to buy/not buy low-fat ground beef by age group. Even though stated intentions do not necessarily imply purchase incidence, this information will give management some idea on which age-group is more health-conscious.

Apart from such basic analytical techniques, researchers may use a large array of complex statistical methods that may be more cost-effective and reliable in decision-making. These statistical techniques can be classified as either univariate or multivariate based on their nature. As these names imply, univariate techniques are only appropriate when each variable is analyzed in isolation while multivariate analysis refers to statistical methods which simultaneously analyze more than two variables on a sample of observations.

As concisely stated by Bellenger and Greenberg (1978), deciding on which multivariate method to use is based on judgments the marketing researcher must make about the nature and utilization of his data. The researcher has to determine whether the data can be partitioned into dependent and independent variable sets; and if so, how many variables are in each set. Lastly, non-metric measurements (such as nominal or ordinal scales) lead to a qualitative approach while metric measurements (such as interval or ratio scales) are appropriately analyzed using quantitative techniques. Answers to these basic questions determine which technique is used to analyze the data. Only a selected group of multivariate analytical tools will be covered in this chapter, with more emphasis put on conjoint measurement techniques. Since

marketing research is often concerned about investigating the interdependence among variables, the appropriate multivariate methods such as factor analysis, cluster analysis, and multidimensional scaling will also be discussed in this chapter.

ii. Multivariate Techniques

Multivariate techniques can be classified broadly as either dependence or interdependence techniques. Dependence techniques apply when one or more variables can be identified as dependent and the rest are independent. The number of dependent variables will also influence the choice of a dependence technique. Otherwise, where variables are neither classified as dependent or independent, interdependence techniques are applied to measure the interdependent relationships among all the variables. Figure1 provides an overview of the various multivariate analysis techniques.

As illustrated in Figure1 below, dependence multivariate techniques can be categorized depending on whether there are one or more dependent variables involved. The only dependence techniques considered in this paper are discriminant and conjoint analysis. In interdependence techniques, the variables are not classified as either dependent or independent. Instead, interdependence technique focus on either the variables or objects. Factor analysis is an appropriate measure of interdependent relationships where the focus is on the variables, while cluster analysis and multidimensional scaling techniques of interdependence can be classified as focusing on objects.

a. Interdependence Techniques

Factor analysis is based on the notion that any systematic interdependence realized among a set of observed variables must be due to some fundamental

(latent) factor which creates this commonality. In fact, one can consider all the manifest variables merely as indicators of this fundamental factor (Bellenger and Greenberg , 1978). If this is true, it should be possible to extract factors from the observed data by grouping all the manifest variables into factors based on their commonality. For example, if an individual's social status can be indicated by their income, education, occupation, and residential area, it should be possible to summarize all these indicators into one factor (i.e. social status in this case). Apparently, other than for identifying underlying constructs in the data, factor analysis is also used as a data-reduction method which summarizes all the commonality of all the manifest variables into a few factors.

Using the social status example, a researcher may ask several questions including income, education, and occupation to determine an individual's social status. Conversely, a combination variable based on these questions may be used to determine a person's social status. In other words, buying behavior is rarely attributable to merely one cause, therefore, the inquiry must set out to identify multiple factors that are influential in certain buying conditions. The need to combine factors into a single question may sometimes be necessary to avoid redundancy while at the same time reducing the number of questions to manageable numbers. Multidimensional scaling and cluster analysis are other

techniques that serve to combine questions, thereby creating new variables.

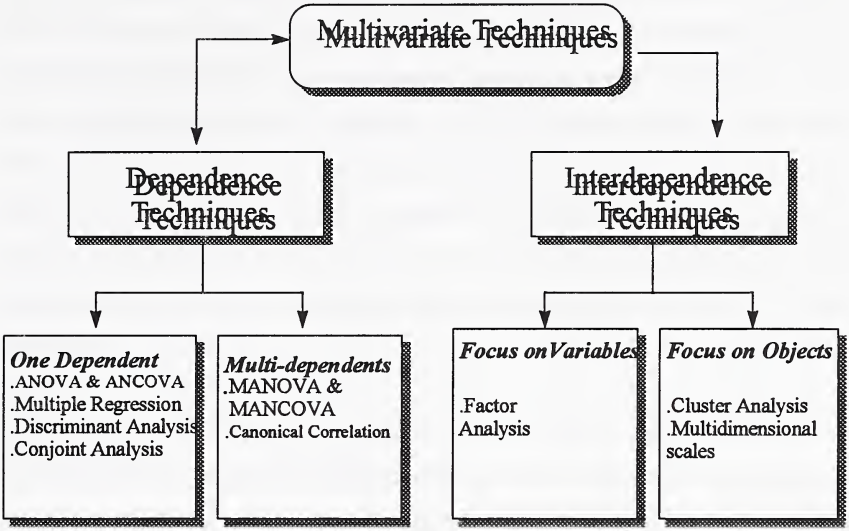

Figure 1: Classification of Multivariate Statistics
(Aaker et. al., 1995)

Factor analysis has been widely used in research on market segmentation, preference analysis, forecasting and product positioning. For example, it has been used to extract dimensions of relative liquor preferences such as sweetness, price, and regional popularity (Alpert and Getty (1969) in Chisnall, 1981). It has also been used in brand-image studies relating to consumers' lifestyles. Chisnall (1981) cites one study which identified beer drinkers of 'Brand Y' as outdoors-men who are more inclined to be hard drinkers while 'Brand W' drinkers were cosmopolitan travelers and cocktail drinkers who seem to seek more oral satisfaction. This could be one of the significant factors in establishing consumers' lifestyles.

The factor analysis approach to marketing research is not without pitfalls. The greatest limitation is its high level of subjectivity. The determination of factors, their interpretation, and rotation[3] are all subjective. That is, the rotation may be continued indefinitely if one set of factors displeases the analyst. Besides, there are no statistical tests that are regularly employed in factor analysis (Aaker et al., 1995). It is therefore often difficult to know if the results are meaningful or merely coincidental. Therefore, the standard procedure should be to divide the sample randomly into two or more groups that are independently factor analyzed. The emergence of similar factors in each analysis should help confirm the findings with certainty.

As illustrated in Figure 1, factor analysis and cluster analysis are interdependence techniques differing only by focus. Factor analysis focuses on variables while cluster analysis focuses on objects. Factor analysis examines people, products, or brands and attempts to evaluate them in terms of clusters or comparative profiles. As Bellenger and Greenberg point out, the objective of cluster analysis is to classify a population of entities into a small number of mutually exclusive and exhaustive groups based on the similarities of their profiles. It attempts to identify the number of groups that exist in a population, and their composition. It differs from discriminant analysis in that all the numbers and characteristics of the groups are not predefined.

This cluster technique seems to be useful to segment markets on the personality, socioeconomic and demographic, psychological, and purchasing characteristics of the customers. For example, one might cluster brands or products to determine which brands/products are regarded as similar and therefore competitive. If brands/products seem to be bought by the same group of people, joint promotion and advertising strategies might be possible.

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[3] This refers to each solution resulting from factor analysis.

Thus, the beef industry might classify customers into segments based on the product benefits that they seek and marketing programs could be developed and tailored to satisfy individual segments. Other examples include clustering of test-cities so that different marketing programs can be compared by trying them out in different cities. Cluster analysis has no standard statistical tests to ensure that the output is not purely random. This makes it difficult to evaluate the quality of the clustering analyses. Most of the clustering methods are judgmental and they provide inefficient statistical inferences. In fact, selecting and coding of attributes as well as choosing from various clustering algorithms is all based on individual judgments. Therefore, most clustering methods are not reliable, and it is difficult to know which clusters are exactly similar and which objects are difficult to assign.

Much of marketing management is concerned with product positioning. A general way of positioning objects in perceptual multidimensional spaces is termed multidimensional scaling (MDS). MDS proceeds by first identifying dimensions upon which customers perceive or evaluate objects (such as brands, products, or services). The objects are then positioned with respect to these dimensions using perceptual maps, for example (Aaker et al., 1995 and Blankenship and Breen, 1992). MDS is based on the notion that people perceive a set of objects as being more or less similar to one another on a number of dimensions that are usually not correlated with one another. In other words, it should be possible for consumers to evaluate beef products that are mutually exclusive based on features such as convenience, health consciousness, and merchandising attributes. However, it is not always possible to graphically portray perceptual maps, especially where more than two dimensions are needed to represent customers' perceptions and evaluations. Even where it may be possible to place objects on perceptual maps, it may be impossible to obtain such a multidimensional map from the respondents.

Respondents may not be aware that they are using these dimensions to judge similarities among objects or they may be unwilling to reveal the factors (dimensions) they use in judging objects. As a result, marketing managers rely on statistical methods of multidimensional scaling to infer the number and type of dimensions that presumably underlie the expressed similarities among objects.

Basically, MDS statistically transforms the judged similarities into distances by placing the objects in a perceptual map. For example, if brands A and B are perceived as most similar compared to all other brands of the same product, this technique will position brand A and B on a perceptual map in such a way that the distance between them is shorter than that between any other two brands. An attribute-based or nonattribute-based approach can be used to derive these proximities between brands/products.

Perceptual maps are useful in summarizing the position of brands and people in attribute spaces and in portraying relationships in any other constructs. This is particularly useful in positioning existing and new products to the relevant segments based on the underlying attributes. The problem is that only two dimensions can be observed at one time; the usefulness of MDS is greatly reduced where more than two or three dimensions are needed. Besides, the dimensions of a perceptual map can be difficult, especially where several attributes are involved. Another major pitfall of this approach is that perceptual maps are snapshots, and it is difficult to know from the model how positions may be affected by market events. Also, the generated attributes used by attribute-based models must correctly reflect respondents' evaluations to have any particular relevance to choice decisions.

Interdependence techniques are used in qualitative research to examine interdependent relationships that exists among a particular set of factors. In fact, interdependence techniques do not classify variables as either independent or dependent, but examine the whole set of interdependent relationships. These techniques can be further classified as focusing on variables or objects (as is in factor and cluster analysis). The interdependence techniques discussed in this section include factor analysis, cluster analysis, and multidimensional scaling. Marketing researchers are often interested in determining the relationships between various aspects of the marketing function. If so, it may also be necessary to measure the strength of association and the nature of the relationship between two or more variables. For example, the goal may be to determine how beef usage and consumption patterns and or rates respond under a variety of conditions. Another goal may be to understand or predict the likely initial demand for such a product or concept under a variety of conditions. These are some of the questions that may be answered using dependence techniques.

b. Dependence Techniques

Dependence techniques are appropriate when one or more variables can be identified as dependent variables and the rest as independent. These multivariate techniques can also be classified into single dependent or multiple-dependent techniques based on the number of identified dependent variables.

Like conjoint analysis, discriminant analysis is a dependence technique that is based on one dependent variable. If a single dependent variable is dichotomous (such as buy/not buy) or multichotomous (such as non-user/light-user/heavy-user), the multivariate method of discriminant analysis is appropriate. The main objective of discriminant analysis is to generate dimensions that will

discriminate or separate objects as much as possible. Suppose a researcher wants to determine who are the buyers of high-quality beef, discriminant analysis may be used to distinquish between the buyers of high, medium, or low-quality, beef based upon the combination of underlying attributes. Note that this approach implicitly assumes that individuals form perceptions about objects (products/brands) and they use individualized decision rules to choose among competing alternatives, based on underlying combinations of attributes. For this reason, the extent to which any attribute will be an important contributor to a dimension depends on the extent to which there is a perceived difference in the object based on that attribute.

Thus discriminant analysis may be used in two ways in marketing research. It can be used for classification purposes or to analyze known groups to determine the relative influence of specific factors in determining into which groups various objects fall. The former may be used to classify customers into users and nonusers, or light users and heavy users of a product, and many other categories. In the latter case, a researcher may have brand ratings that allow respondents to classify a particular cut of fresh-beef as a high, medium or low quality brand. In either case, the discriminant analysis is more manageable when the dependent variable is dichotomous than when it is multichotomous.

Another dependence technique of interest in this study is conjoint analysis. The conjoint measurement technique continues to enjoy increasing use both in marketing research and in wider management decision making (Green and Srinivasan, 1978). Conjoint analysis is a collective term that refers to a number of paradigms in psychology, economics and marketing that quantitatively describe consumer preferences or value tradeoffs. This technique starts with the consumers' global judgments about a set of complex alternatives and decomposes these into separate and comparable utility scales from which the

original global judgments can be reconstructed. It is a simultaneous measurement of joint effects of two or more explanatory variables on the exogenous variable (Green and Rao, 1971; Green and Wind, 1975; Green and Srinivasan, 1978 and Fenwick, 1979).

Since its introduction to the marketing research literature in the early 1970's, conjoint analysis has become one of the most embraced marketing research methods for understanding and predicting consumers' tradeoffs. The attractiveness of this measurement technique lies on the ability to separate global judgments into psychological and physical product components, from which a researcher can ascertain information on the relative importance of various combinations of product attributes. This type of information is useful in developing new products and concepts or modifying and/or repositioning existing products. Other commercial applications of conjoint analysis in marketing include pricing, market segmentation, advertising, distribution and logistics.

The conceptual foundations of conjoint measurement as applied in marketing, arise from the theory of consumer demand, especially the pioneering work of Lancaster (1966). Lancaster's notion departs from traditional economic theory of consumer demand. It maintains that utility or satisfaction is derived from the properties or characteristics which goods possess rather than from the goods themselves. He postulates that goods are purchased singly or as a combination to produce the characteristics that define the consumer's derived utility (Ratchford, 1975). In other words, a derived utility level associated with the consumption of a particular good is an additive representation of a series of relevant sub-utilities resulting from an optimal combination of underlying product attributes. Following this notion, it is possible to define economic goods as bundles of characteristics or attributes, and consumer's utility for an

economic good can subsequently be decomposed into separate utilities for attributes provided by the good. One central implication of consumer behavior is that a consumer can exercise rational choices based on complex multidimensional tradeoffs. That is, consumers make overall judgments about relative values of attributes and select one alternative which provides the highest level of utility.

Quantification or evaluation of consumers' judgments has long been of challenging interest in marketing research. This approach involves the identification of relevant multi-attribute alternatives that a consumer must evaluate; the conjoint analysis technique allows analysts to study and model how consumers evaluate products. As earlier mentioned, nowhere have conjoint techniques been so widely embraced and applied as in marketing. The reasons for these are clear:

- Marketing research is frequently concerned with ordinal or ranked responses. While consumers can easily place brands in order of preference, or rank stores in terms of value for money, it is unlikely that they can assign meaningful numerical scores to these stimuli. Similarly, where responses or rating scales are collected, there is little evidence to support that such data has any other meaning beyond ordinal significance. This problem can be easily overcome through conjoint measurement methods due to their non-metric nature.

- Marketing also involves multi-attribute stimuli: brands, packages, advertising, etc., whose individual or collective influences are of interest to management. Many of these attributes cannot be measured on interval scales. They are either subjective ratings (such as sweetness, creaminess, etc.) or categorical variables (such as color, brand name,

etc.). Using conventional analysis can be difficult and clumsy for this type of research; however, conjoint analysis is designed to handle this type of analysis.

b.1. Stated vs. Revealed Preference

Let us first address the reasons why analysts in several disciplines, including psychology, marketing and transportation, have departed from indirect methods of analyzing individual choice behavior. Indirect methods use revealed preference (RP) over choices offered in real markets to develop, analyze and implement models of choice. The use of RP data receives very strong theoretical support due to the availability of a rich and well developed economic theory for specifying and testing of econometric models of choice. However, the growing acceptance of stated preference (SP) methods is partly due to real constraints in RP data (Kroes and Sheldon, 1988).

The drawbacks of RP methods are more evident in situations where there is a need to estimate the likely initial demand and market potential for new products and services. Since new products and services may contain characteristics or attributes not currently offered in the market, any extrapolations would be outside the data range used to estimate the model. Using RP data is clearly appropriate in making inferences about individual choice behavior, however, there is often not enough variation in RP data to efficiently capture the interactions between factors that influence choice due to collinearity among attributes (Adamowicz et al., 1992 ; Wardman, 1988). This prevents analysis of factors that influence choice behavior.

An advantage gained from using data that has been generated experimentally is the ability to manipulate the nature of variation in characteristics of choice alternatives. This allows for sufficient othogonality among characteristics permitting unconfounded estimations of interactions and hypotheses testing in

choice behavior. Besides, experimental data is easier and cheaper to control, and more flexible. Even though the actual behavior is not observed in stated preference (SP) data, this provides the ability to predict the likely market response for products and services not yet offered in the market since the analyst can control conditions, variations and breadth of hypothetical profiles that are presented for evaluation. However, there is no guarantee that people won't overstate their intentions and people may not necessarily do what they say.

The SP approach basically refers to a family of techniques which use stated responses to estimate utility. These are available under a wide variety of names among which "conjoint analysis" will be used in this discussion. Conjoint paradigms differ in experimental design procedures, types of response modes and analytical methods. Even though their common interest is to understand how individuals trade off a decrease on some attributes to gain on other attributes, each response strategy will define the available output.

An individual may be asked to state preferences among a set of combinations of attributes which define a product or service or to choose a most preferred combination of attributes. Therefore, the decision on which type of response strategy to pursue has to be addressed at the beginning of a SP study (Hensher, 1993).

As stated above, by modeling demand in terms of underlying product attributes, researchers have analyzed revealed preference data and implicitly made inferences about individual consumer behavior. These revealed preference methods are a most appropriate tool for deriving utilities and estimating models of demand. However, these revealed preference methods are not appropriate in predicting the initial demands for products that are not

currently on the market. It is due to such problems that the use of stated preference data became an attractive option in marketing research. However, the major disadvantage of this approach is that people may not necessarily do what they say.

A number of different conjoint paradigms are now available to researchers interested in applying conjoint analysis to study consumers' choice decisions. These paradigms differ in the response modes that are used to obtain information from subjects. They also differ in the methods of analysis, and inferences that can be made about judgments or choice behavior. (Louviere, 1988). There are three main types of responses, mainly "rating", "ranking", and "choice" responses. These are discussed in the subsequent section.

b.2. Rank-order Method

The conjoint analysis of rank-order was first popularized by Green and Rao (1971) and Green and Wind (1973). In this approach, each rank corresponds to an alternative. If we have N alternatives, an individual is assumed to rank all feasible alternatives in order of preference such that N ranking scales (r_i) correspond to N alternatives. The responses can be expressed in order of preference such that $U_{r1} > U_{r2} > \ldots\ldots\ldots U_{rN}$ assuming no ties are possible. And U_{ri} denotes a series of utility levels associated with all feasible alternatives ranked from highest to lowest in order of preference. Note that the only relevant information is provided by the ordinal measurements in the data set. In other words, because the consumer can only rank alternatives according to preference, without providing information on how much difference there is between the elements of the choice set, the analysis is limited to ordinal interpretations. For example, the brands of fresh-cut beef can only be ranked according to quality, from highest to lowest, without any meaningful direct comparisons among competing brands of beef.

Even though the development of rank order experiments follows from the theory of Luce and Turkey (1964), its application does not conform to economic theory. The major drawback of this conjoint measurement is the fact that it relies on the numerical responses of the orthogonal arrays of attributes and not the individual choice behavior. It requires a wide range of ordinal conditions to be satisfied before a suitable utility specification can be identified. Ranking scales are much more difficult than rating scales because they involve comparisons among competing alternatives (such as brands, product variations, and so on). This feature of ranking scales may force respondents to make choices they might not otherwise make, especially where several objects are compared.

It is conceivable that most individuals are not perfectly consistent in their rankings and if information that they provide is inconsistent with the models of decision making, it is not clear how useful their application would be under any situation. Those who analyze rank order data assume that individuals' rankings are generated by a strictly additive utility function. This assumption is necessary for derivation of part-worth utilities from main effects designs. But if the underlying specification is not additive, part-worth utilities will be biased. In fact, several studies in transportation theory including Lerman and Louviere (1978) and Louviere and Meyer (1981) have demonstrated that utility specifications are not additive. As a result, one should question the validity of the additive assumption.

More recent efforts to rescue this theory were made by Chapman and Staelin (1982), Hensher and Louviere (1983), Chapman (1984) and Bunch and Batsell (1989). Chapman and Staelin proposed a method to analyze rank order data in a manner consistent with multinomial (MNL) models and random utility

theory. This "rank explosion"[4] procedure translates rank order data into choice responses. The rank order explosion is consistent with Luce (1959) in that the MNL and Luce models share many of the same properties of Independence of Irrelevant Alternatives (IIA)[5]. Therefore axioms of choice[6] also apply to MNL models. Chapman (1984) later examined the relative efficiency of parameters based on various numbers of ranking depths for individual-level estimation of part-worth parameters. Like Bunch and Batsell (1989) their results reveal the need for individuals to rank a very large number of profiles in order to obtain efficient individual-level MNL parameters. In fact one has to be careful with the individual-level analysis of rank order data since it is not practical to present individuals with large numbers of profiles.

It is standard to assume that the individual is transitive and perfectly consistent in his/her ranking of unobserved choice sets as implied by rankings. However, Louviere (1988) notes that individuals sometimes use elimination and nesting strategies in their ranking behavior which may violate the IIA assumptions of MNL models. It may also be unrealistic to assume that an individual's ranking of profiles will perfectly correspond to the actual choices that are made in the face of alternatives of varying depth and composition in any subset. Even more troubling is a finding by Ben-Akiva et al. (1992). These authors found response data from different ranking profiles to be unreliable and to produce estimates

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[4] For example if one has four ranking scales, these can be translated into (4-1) choice observations such as alternative 1 is chosen among four alternatives if rank=1; alternative 2 is chosen leaving alternatives 3 and 4 if rank=3; and alternative 3 is chosen against alternative 4 if rank=3.

[5] The IIA property holds that for a specific individual the ratio of the choice probabilities of any two alternatives is entirely unaffected by the systematic utilities of any other alternatives (Ben-Akiva and Lerman;1985).

[6] Thus, the choice probabilities from a subset of alternatives are dependent only on the alternatives included in the subset and are independent from any other alternatives that may exist.

of utilities that are significantly different. Therefore one has to be very cautious in applying these methods to estimate the parameters of MNL models.

b.2.Rating Scale Method

Respondents are asked to express their preferences for various commodities and services in numerical scales. For example, analysts typically select some point scale (such as a 10-point scale) to represent an underlying continuous distribution of interval-scaled rates. Thus, an analyst assumes some subjective common scale which is applied to all stimuli throughout the task. One problem associated with the rating method is the tendency for some individuals to use only a small part of the scale, which introduces some response bias in the analysis. A common estimation procedure is to use techniques such as generalized least squares to obtain parameters of estimates which are applied via a logit transformation to obtain choice probabilities. This approach is highly questionable due to the discrete nature of the ratings response data.

One of the appealing features of the rating scale method comes from the fact that, unlike the conjoint rank order method, it permits tied data and interval scaled information. This feature makes the procedure to be the richest response metric in that it gives order and degree of preference. Louviere (1988) outlines several reasons why rating scales might be more appealing than the rank order methods in conjoint tasks. Rating scales allow respondents to rate conjoint treatments, existing products or services, and/or non-choice alternatives on the same scale in the same task. If ratings responses can satisfy the MNL scale assumptions, one can predict the choice probabilities of currently offered alternatives that are in competition with future or new alternatives as described by different hypothetical combinations of attribute levels. One can also avoid the use of cardinal measurement assumptions that

are needed to analyze data using traditional statistical estimates by estimating ratings data as high and low values of utility.

However, there are no formal axioms that define the theoretical statistical behavior of ranks observed in multi-attribute options, making it impossible to test the parameters of estimates against competing specifications. But if the ratings data do satisfy the cardinal measurement assumptions, there is a large suite of statistical tests for model specification and performance. Using discrete choice methods alleviates these problems.

b.3. Choice Data Method

A problem of interest to marketing and transportation analysts is to predict accurately the demand or market share for products or services that may or may not currently be offered in the market. Underlying the fundamental need for a product or service is satisfying a series of cognitive process(es) that individuals engage in when making tradeoffs between a set of competing alternatives from which only one is ultimately selected. Unlike in rating or ranking methods, a respondent is presented with a choice set from which to select a single preferred alternative. If alternative i is chosen over alternative j, this response implies that $U_i > U_j, j \neq i, j \in C$ where U_i and U_j denote utility levels of alternatives i and j. Understanding the fundamentals of individual choice behavior enhances the provider's ability to accurately reflect characteristics of products or services relevant to potential users.

The obvious advantage of discrete choice methods is that one can directly estimate choice models from choice data. This avoids necessary ad hoc assumptions implied by rating or ranking of a single choice set. Even more appealing is the ability to design, observe and estimate stated preference experiments that describe potential multi-attribute choices of real and/or

hypothetical alternatives. This allows the empirical analysis of a choice problem to be extended beyond currently available feasible choice sets (as provided by RP data) using experimental choice analysis.

In addition to the ability of SP experiments to extend analysis beyond observed attributes levels, they enable introduction of sufficient variation within and across alternatives to avoid collinearity problems that often plague RP data analysis. In fact, the recognition of drawbacks and strengths in RP and SP data suggests that, where possible, the joint estimation of SP and RP should enrich modeling of individual choice behavior (Adamowicz, Louviere and Williams, 1992).

Experimental choice design was first formalized by Louviere and Woodworth (1984) and Louviere (1984). They presented necessary and sufficient conditions which experimental choice design must meet to satisfy statistical requirements of MNL choice models. One only needs to assume that the experimental choice data satisfy the IID Gumbel distribution assumption, which yields the MNL choice model. In addition, unlike rank order or ratings conjoint methods, there is no need to make assumptions about order or cardinality of measurements. Instead, one can just observe outcomes of conjoint choice experiments and directly model choices (Louviere, 1988). As already mentioned, probabilistic discrete choice models provide a conceptual framework for analysis of individual choice behavior. And a variety of specifications are available for estimating individual choice behavior depending upon the error assumptions of distribution, choice probabilities and/or choice processes. The discrete probabilistic choice model in this analysis adopts a random utility approach to allow for variations in choice due to within and between individual variance, omitted variables and measurement. The random component is assumed to be a IID Gumbel distribution which yields a MNL

choice model. Of course, individual-level choice models can be estimated if one can observe enough discrete choices to achieve asymptotic parameter efficiencies.

iii. Chapter Summary

Having collected required data, the research process proceeds by analyzing and transforming the data into information that management can use in decision-making. Various multivariate analysis techniques have been discussed in this chapter. These techniques can be broadly classified as either interdependence or dependence techniques. The interdependence techniques discussed in this chapter include factor analysis, cluster analysis and multidimensional scaling while the dependence techniques include discriminant and conjoint analysis.

There are three basic judgments that the marketing researcher must make about the nature of the data in choosing the appropriate analytical technique. The researcher must first determine whether and which variables can be treated as dependent or independent in order to make an appropriate choice of the type of technique. Dependence techniques are appropriate where one or more dependent variables are identified and the remaining are independent variables. The variables are not classified as either dependent or independent in interdependence techniques; rather, the whole set of interrelationships among a particular set of variables is examined.

Another important determination lies with the properties of the data. Specifically, are the data qualitative (non-metric) in that the responses are on nominal or ordinal scales, or are they quantitative (metric) and scaled on interval or ratio scales? The technique to be utilized depends upon the answers to this and the other questions raised above.

These analytical techniques have been used in numbers of studies to address various marketing problems. However, the main focus in this review is to demonstrate how food market researchers have used preference models to understand various aspects of consumer-product relationships, especially for beef. Some of these were noted in the first chapter of this paper. The next chapter gives a review of some of the applications that address questions already raised. Included in the review is an overview of the research techniques used in each study and how these relate to the subject at hand.

Chapter 4

RESEARCH APPLICATIONS

i. Introduction

As already mentioned, qualitative research is frequently used to examine consumers' attitudes in relation to products or services. This is useful to marketing managers to increase their understanding, expand knowledge and clarify issues relating to consumer behavior and the marketing function. For instance, updated information is required to understand changing consumers' behavior and attitudes. It is evident from the literature that researchers tend to simply classify types of consumers not just by demographic criteria but by more complex attitudinal or behavioral descriptors (Gordon and Langmaid, 1988). Marketing researchers need to understand how consumers relate to a product, product category or brand through psychological cues which cut across demographic characteristics.

Many studies of meat demand have employed quantitative techniques on annual time series data to determine the sources of changing consumption patterns for beef and beef substitutes. For example, numbers of studies have been directed toward relating meat consumption to demographic factors and how these factors influence consumer purchasing behavior (e.g. Buse and Salathe, 1978; Cox et. al., 1989; Lee, 1989).

Recent developments in consumer behavior analysis have also allowed researchers to model consumer demand using qualitative techniques. These

recent developments draw on Lancaster's (1971) notion of part-worth utility and hedonic price modeling (Rosen, 1974; Lucas, 1975). Researchers have used hedonic pricing models (Ladd and Suvannut, 1976; Unnevehr and Bard, 1993) and other contingent valuation methods (Mitchell and Carson, 1989) to measure directly consumers' willingness to pay for different characteristics of consumers' goods. Conjoint paradigms are also gaining popularity as aids to marketing managers in sorting out the relative importance of a product's attributes in consumer choice behavior (Green and Rao, 1971; Green and Wind, 1975; Green and Srinivasan, 1978). The trend away from traditional demand analyses contributes to a wide range of marketing research approaches to address problems that involve buyer's behavior.

ii. Literature Review

Recent changes in consumption patterns for beef in Canada and among other countries have been the source of concern to many in the beef industry. As a result, several studies have been directed toward identifying the sources of these changes in beef consumption as well as in the consumption of beef substitutes (Braschler; 1983; Chavas, 1983; Eales and Unnvehr, 1988; Moschini and Meilke; 1989; Chen and Veeman, 1991). These studies have employed annual time series data on aggregate per capita meat consumption, prices and income to assess structural change in the demand for meats. Most of these studies applied a static almost ideal demand system (AIDS) to determine whether or not there has been structural change in the demand for meats in Canada and the United States. Tests of structural change suggest a preference shift away from beef toward chicken after 1974 (Braschler, 1983; Chavas, Eales, 1988; Unnvehr, 1988; Moschini and Meilke, 1989). Even though these findings were roughly consistent with findings of other studies, the results of many

systems of demand tend to violate some of the restrictions implied by economic theory.

Pollak (1970) and Deaton and Muellbauer (1980) suggest some interesting reasons for a tendency for consistent tendency for violation of one of the demand restrictions implied by economic theory. They pointed out the importance of separating short-run and the long-run effects in demand systems. Consumers are sometimes bound to contractual obligations that may prevent them from adjusting consumption patterns in response to changes in income and food prices until such time that they are no longer bound. An individual's current preferences may also be partly influenced by the individual's past consumption patterns (habit formation), but not his/her consumption in the more distant past. A consumer's ignorance of consumption possibilities beyond past consumption experience may constrain his ability to respond to market changes. Preferences may depend on other peoples consumption (interdependent preferences). In addition, the continuing awareness of health hazards and "how to eat right" may shape how consumers perceive and choose what they eat. And one more interesting effect that one may choose to incorporate in food demand functions is changing demographics, the most important of which include size and age composition of households.

As a result, studies have also been directed toward relating meat consumption to demographic factors such as family size, household income, and family consumption (Chavas, 1983 and 1989; Capps et al., 1988; Cox et al., 1989; and Lee, 1989). Other than the changes in relative prices between beef and white meats, Chavas (1989) attributed the changing consumption patterns in beef to changes in lifestyle of consumers and their concerns about health related issues. These finding were also supported by Capps, et al. (1988) in showing that attitudes toward buying low-fat foods are important in beef-purchasing

behavior. There is, however, little empirical evidence to show the effects of health concerns on the consumption of beef. Unfortunately, the application of traditional demand analysis (using aggregate market data) may be inadequate to address many questions of interest in marketing today. As a result, numbers of researchers in marketing and economics are adopting a qualitative approach to demand analysis in order to understand the factors that influence buyers' behavior.

To better understand the direction that the beef industry, in particular, may take in new product development and merchandising techniques, marketing research is being undertaken applying conjoint-based analyses to understand consumers' attitudes toward current and potential new products. Most of these applications rely on the notion that consumers make rational, utility-maximizing choices, and the consumer is expected to choose the most preferred of the available products as long as preferences remain unchanged (Pessemier and McAllister; 1982).

Other concerns in consumer-product relationship research are to describe consumers' social cues (cutting through demographic descriptors) as they relate to purchasing behavior. Salient lifestyle changes and recent health concerns, for example, greatly impact on how consumers make choices among products rather than the liking for the products themselves. In other words, consumers who view themselves as health conscious seem to be likely to select products, not so much for their physical offerings, but based on how those individual consumers perceive product quality. This may be particularly true for meat products, since nutrition experts have told consumers to reduce consumption of saturated fats, for health reasons, by cutting down on meat intake.

Marketing research is being used to determine the direction that the beef industry should take in new product development and merchandising techniques, and to provide information regarding consumers' perceptions toward current beef products. For example, managers require market information when developing new beef products or repositioning existing ones. They must know the market and understand the nature of the product or product concept. Beyond the fundamental needs that a product fills, management must have a way to evaluate which of the product's attributes the consumer perceives to be the most important.

Also, in light of growing competition in the beef industry and the feature that promotion strategies between retailers and meat packers sometimes overlap, having knowledge of consumer choice behavior is of importance. This is necessary to be able to answer questions such as: who prefers which table-cut? what factors determine choice within a product category? and what factors are more important to a meat packer and/or a retailer in order to gain a competitive edge? Some of these issues are of more importance to processors. For example, if a proportion of beef consumption switches between various cuts, or even away from beef, due to concern about health related issues, this information may be of more interest to meat packers than to retailers (Bucklin and Lattin,1991; Bucklin and Gupta, 1992).

Particular questions arise regarding how consumers evaluate attributes of beef and beef products. What can meat packers do to improve the relative position of different table-cuts and processed beef in the minds of consumers?. Question of concern to marketers is not only how different market segments differ in their product perception and preference and how to address consumer preferences in new product offerings (Gundry et al., 1988; Capps et

al., 1988; Menkhaus et. al., 1990; Sapp and Knipe, 1990; Menkhaus et al., 1993; and Unnevehr Bard 1993).

Several studies have been based on survey data where respondents are randomly selected to complete a self-administered questionnaire on demographics, buying practices and attitudes toward a particular product or service. For example, several studies that attempted to identify several demographics, psychographic characteristics, and consumer concerns that affect purchasing patterns for beef used self-administered surveys. Others have used mall-intercepts to initially identify shoppers that are willing to participate in the study and were later contacted by telephone (Capps et. al., 1988). The findings from many of these studies agree on the need to address health issues in the beef industry. They all recognize the need for research needs to better address perceptions of health issues, perhaps through market segmentation, product differentiation, or new product development. In any event, identifying factors (demographic, psychographic, etc.) which influence perceived product characteristics would contribute to improved marketing strategies.

There is also a growing body of research that uses focus groups, or a combination of focus groups and depth interviews, to closely study buying behavior under a controlled atmosphere. Menkhaus et al. (1988) attempted to identify factors which are important in influencing purchase and reorder decisions for a branded, low fat, fresh beef product. They found health-related factors and visual differences to be significant in influencing the probabilities of reordering and purchasing. This study took a simulated market approach where customers entered into a simulated supermarket in groups of five to pick a particular beef product that each desired.

iii. Chapter Summary

This review indicates that marketing and economic research is trending away from a macro oriented analysis to a more micro oriented demand analysis. It suggests that agri-food industries, especially the beef industry, may be focusing more on marketing rather than the traditional commodity-oriented sales approach. Industries appear to be putting more emphasis on consumer perceptions as the basis for designing products and services. The characteristics of interest to particular consumer segments tends to drive product development and other marketing functions. This shift in emphasis has implications with respect to types of information needed and the methods of obtaining such information.

One interesting observation from this literature concerns conflicting motivations in marketing research. For a long time, researchers seem to have been motivated toward developing simple and accurate tools for conducting demand analysis. This motivation may have come at the cost of providing a broader range of accurate information about individual consumer's choice behavior. On the other hand, while the evolution is toward models which are rich in psychological detail, this has come at the cost of the ease of implementation and statistical validation.

The seemingly greatest task facing researchers today is developing models that reconcile the fields of psychology, economics and applied marketing. These need to provide psychological detail and possess the axiomatic rigor of economic theory while they enable widespread applications. Success in meeting this need will provide an understanding of how consumers alter choices in response to observed changes, or as a result of learning, while it ensures the robustness of choice data to alternative model specifications.

Chapter 5

CONCLUDING SUMMARY

Markets for foods are continuously changing due to changes in consumers' preferences and salient lifestyles. The beef industry is one example. It has been influenced by changes as consumers' consumption patterns appear to have shifted away from red meats to white meats and other lean-meat products. The beef industry is faced with a challenge to understand consumer purchasing behavior and to identify those product attributes that are of most interest to consumers. Several studies have been conducted to determine the sources of these changes in consumption patterns for beef and other food products. Some studies have been directed toward identifying demographic characters that may influence aggregate behavior while others have employed annual aggregated data to address some of the questions that were addressed early in this paper.

There is a growing interest in marketing in the study of consumer behavior and in evaluating product attributes brought about by the need to reflect consumers' preferences for products and services. Marketing managers must know their market; They must also understand the nature of their products and any other product concepts under consideration. Even more importantly, marketing management must have the means to answer questions relating to products-consumer relationships. In addition, in order to market products most effectively, management must have a means to answer several questions that arise in marketing.

This review discussed a selected number of marketing research techniques that use primary data to aid in problem-solving in food product markets. Various research approaches have been compared in relation to their applicability in marketing management. Several questions of interest to marketers have been raised and marketing techniques have been suggested for answering these questions. The review provides a framework to understand some of the tasks facing marketing researchers.

These tasks include identifying those socioeconomic characteristics that significantly influence consumer purchasing behavior in food markets. Knowledge of household characteristics affecting purchasing behavior is important in defining target markets and in designing customized marketing strategies. Also discussed was how marketers can apply research techniques to determine which elements of a product or product class significantly affect marketing functions such as pricing and promotion strategies. For instance, if customers are more price sensitive in choosing between beef steaks, pricing information is important in planning promotion strategies. The message here is that if respondents can be segmented based on their demographics and preferences, it should be possible to study the behavior of homogeneous customer-groups and to design marketing functions accordingly. How this type of information is obtained is yet another question.

The research approaches considered in this paper can be classified under two general classes, namely qualitative (focus groups and depth interviews) and quantitative (personal, mail and telephone surveys) research techniques. Qualitative research is about what people think and what they perceive. It is the research technique that involves subjective information such as perceptions and feelings. Given several problem areas best suited to qualitative research, it can be concluded that this methodology answers questions such as 'what',

'why', and 'how', but not 'how many?'. Unlike in quantitative research, qualitative research is concerned with understanding a particular issue such as a market, package, brand or advertising campaign rather than providing measurements. It can also be concluded from the discussion that qualitative research allows for open-ended, dynamic and flexible questioning procedures. When properly designed and executed, it can tap into consumers' creativity and provide researchers with a deep understanding of the problem area. It can be an efficient source of ideas for creative marketing teams because of its ability to penetrate rationalized and superficial responses to generate broader and deeper databases. Quantitative research, on the other hand, is about statistical and numerical measurements. It provides numbers that can be defended or challenged for issues that can be measured. In other words, it provides 'hard' information that are more than just an opinions. This approach allows for any research work to be repeated, projected and assessed for accuracy. Both types of approaches can be useful to the study of marketing issues and problems. They are useful for providing managers with market information necessary in decision-making. They can also be a means of reducing uncertainty when planning, implementing and monitoring marketing strategies. However, their level of success is largely dependent on how clear and concise the problem definition is.

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